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FOOD VALUES AND DAIRY PRODUCTS

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SUMMARY OF CIRCULAR NO. 235

DAIRY PRODUCTS, milk, skim milk, cottage cheese, and American cheddar or "store" cheese, have definitely been shown to be among the cheapest foods of animal origin as regards both protein and total energy, and it would be of advantage to the American housewife both from the standpoint of economy and of nourishment to increase their use in the diet.

MILK containing 4 percent of fat is a more economical source of both protein and energy than are meats, eggs, poultry, or fresh fish. It is a complete food in itself, containing protein, fat, sugar, "vitamines," and minerals, or ash.

SKIM MILK at 15 cents a gallon is far cheaper as a source of protein and energy than are other foods of animal origin. It is, at this price, cheaper as a source of protein than are dry beans and peas at 15 cents a pound. On the basis of energy the cost of skim milk and dry beans and peas is nearly the same.

COTTAGE CHEESE is a much more economical source of protein than are other animal foods. It is an excellent meat substitute. On the basis of energy, cottage cheese and meats cost nearly the same. It is cheaper than fresh fish, and at 15 cents a pound is cheaper than eggs at 30 cents a dozen.

AMERICAN CHEDDAR CHEESE costs very much less than meat, poultry, eggs, or fish, sufficient to furnish an equal amount of protein or of total energy and is an excellent substitute for these foods.

FOOD VALUES AND DAIRY PRODUCTS

By O. R. OVERMAN, Associate in Dairy Chemistry

To those who have made studies of food values it has long been a matter of common knowledge that milk and its products have been among the cheapest forms of animal food.

Because of the relative cheapness and abundance of all foods, the American people have in the past given little attention to food values, but under the stress of war, the limitation of food supplies, and the rapidly advancing cost of food, their interest in food values has been quickened.

This circular is an attempt to put the comparative food values of some common food substances into readily accessible and understandable form, and to show that the dairy products considered are economical foods.

Three Classes of Food Substances.—Three classes of substances are of prime importance in any dietary. They are the proteins, the carbohydrates, and the fats. The proteins are found in milk, cheese, eggs, fish, lean meat, beans, peas, and in small amounts in many other foods. The carbohydrates include the sugars and starches. They are found in milk, cereals, vegetables, fruits, and nuts. The fats are found in both animal and vegetable food materials and include butter, lard, the fats of meats, and the vegetable oils, such as cottonseed, olive, and corn oils. They are also found in greater or less amount in nuts.

Use of These Food Substances.—These three classes of substances are necessary in any well-balanced diet. Any one of them may serve to produce energy or heat and may be used to build up or repair the body tissues. However, the proteins are essential in certain processes of building up and repair where the fats and carbohydrates cannot be used.

Necessary Amounts.—The amounts of these substances necessary in the daily diet of a man at moderate muscular work have been stated at various times and by many investigators to lie within the following limits:

Protein	2 to 5 oz.
Fat	1⅔ to 2⅓ oz.
Carbohydrate	14 to 18 oz.

It is now generally considered that a comparatively low amount of protein (from 2⅓ to 3½ ounces a day) together with carbohydrate

and fat, is satisfactory and fulfils the needs of the body. For the man engaged in hard work the necessary amounts of these food substances are correspondingly greater than for the man doing light work.

Bases for Comparison of Foods.—In any comparison of foods, both the protein and the energy furnished must be considered. Neither one can properly be used alone as a basis of comparison; nor is it correct to compute the value of a food by considering only the total amount of the nutritive substances.

The burning of a definite amount of any one of the three nutritive substances always produces a definite amount of heat. The amount of heat produced is measured in terms of calories. A calorie is the amount of energy which, in the form of heat, is sufficient to raise the temperature of one pound of water four degrees Fahrenheit.

The amounts of these food substances necessary in the daily diet, as given above, produce from 2,236 calories for the smaller amounts, to 3,202 calories for the larger amounts, distributed as follows:

2 to 5 oz. of protein.....227 to 567 calories
1⅔ to 2½ oz. of fat.....425 to 595 calories
14 to 18 oz. of carbohydrate.....1,584 to 2,040 calories

ANALYSES AND ENERGY VALUES OF MILKS OF DIFFERENT FAT CONTENT

The analyses of milk as given in Table 1 are averages of analyses of milk stated to be of known purity. These analyses were taken from publications of the agricultural experiment stations of Minnesota,[1] New Jersey,[2] and New York,[3] from the work of the Massachusetts State Board of Health,[4] and from unpublished data of the Illinois Experiment Station.

In Table 1 are given the energy values of milks containing different percentages of fat. The number of calories supplied by the quantity of each of the three classes of food substances, protein, fat, and carbohydrate, present in one quart of milk, is listed separately in Column 6. The sum of these, that is to say, the total energy value of a quart of normal milk of the given fat content, is listed in Column 7. The factors used in computing the number of calories which each of the food substances is capable of yielding are the approximate physiological fuel values given by Sherman.[5]

	Calories per gram
Protein	4
Fat	9
Carbohydrate	4

[1]Minn. Agr. Exp. Sta. Bul. 130.
[2]N. J. Agr. Exp. Sta. Bul. 77.
[3]N. Y. Agr. Exp. Sta. 10th Annual Report.
[4]Mass. State Board of Health, 41st Annual Report, 1909.
[5]Sherman, H. C., Chemistry of Food and Nutrition, Macmillan.

TABLE 1.—ENERGY VALUES OF MILKS

Protein	Fat	Carbohydrates	Food substance per quart[1]	Calories per gram	Calories per quart	Total calories per quart
1	2	3	4	5	6	7
perct.	*perct.*	*perct.*	*grams*	*calories*	*calories*	*calories*
2.648			25.87	4	103.48	
	3.00		29.31	9	263.79	
		4.596	44.90	4	179.60	546.87
3.068			29.96	4	119.84	
	3.498		34.18	9	307.62	
		4.903	47.90	4	191.60	619.06
3.044			29.74	4	118.96	
	3.994		39.02	9	351.18	
		4.875	47.63	4	190.52	660.66
3.082			30.11	4	120.44	
	4.516		44.12	9	397.08	
		4.958	48.44	4	193.76	711.28
3.62			35.37	4	141.48	
	5.048		49.32	9	443.88	
		4.922	48.09	4	192.36	777.72
3.743			36.57	4	145.28	
	5.534		54.07	9	486.63	
		4.93	48.17	4	192.68	825.59
3.992			39.00	4	156.00	
	5.94		58.03	9	522.27	
		4.878	47.66	4	190.64	868.91
4.12			40.25	4	161.00	
	6.50		63.52	9	571.68	
		4.90	47.87	4	191.48	924.16
4.22			41.23	4	164.92	
	7.00		68.39	9	615.51	
		4.84	47.29	4	189.16	969.59

[1]In computing these values, 977 grams has been used as the weight of one quart of milk. This is the weight of a quart of milk of specific gravity 1.0323, or nearly the average specific gravity of milk. The use of the minimum or maximum limits of specific gravity of normal milk (1.029–1.035) would change the values so slightly as to be negligible in so far as the purpose of this circular is concerned.

ANALYSES OF FOODS AND THEIR ENERGY VALUES

In Tables 2 to 9 various articles of food which are in common use are listed. The weight of each of the three nutritive substances, protein, fat, and carbohydrate, contained in a pound of the food, is tabulated, as well as the number of calories furnished by each. On page 7 a method is described by which the foods may be compared in relation to their food values.

The analyses of the foods given in these tables were taken, with a few exceptions,[1] from Bulletin 28 (revised edition) of the Office of Experiment Stations of the United States Department of Agriculture.

Columns 1, 2, and 3[2] give the percentages of protein, fat, and carbohydrate, respectively, in each of the foods listed. (As carbohydrates are absent from poultry, eggs, fish, and most meat products, Column 3 is omitted from the tables which include those foods.)

Column 4 gives the weight in grams[2] of each of the food substances in the food.

Column 5 shows the number of calories which may be obtained from the amount of each of the three classes of food substances contained in one pound of the food. Column 6 gives the total number of calories obtained from a pound of the food. In each case the analyses[3] upon which these values are computed are analyses of the food as purchased in the market, that is, with the normal amount of refuse, such as bones in meat, shells of nuts, skins and cores of fruit, etc.

The prices per pound in Column 7 were obtained from retail dealers in Champaign or Urbana during the winter of 1917-18, except those marked with an asterisk (*), in which cases the prices are those published in the Daily Food Bulletins of the United States Food Administration during the winter of 1917-18.

Columns 8, 9, and 10 show the cost, based on the retail price given, of the quantities of the foods which will produce the same number of calories as will one quart of milk containing respectively 3 percent, 3½ percent, and 4 percent of fat. These costs are of value only in case the price at which the food retails is the same as that given in the table.

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[1] The analyses of brick and American cheddar cheese were taken from Bul. 146, Bureau of Animal Industry, U. S. Department of Agriculture. The values for cheddar cheese are averages of all the average analyses given for cured cheese in that bulletin.

[2] Approximately 28⅓ grams are equal to one ounce avoirdupois.

[3] The reader should remember that all the analyses are average analyses; that not every pound of any one of the foods purchased will contain the exact weights of protein, fat, and carbohydrate as given in the table, or yield exactly the same number of calories listed. The values given, however, are as close to what is purchased in the market as it is possible to give.

Columns 11, 12, and 13 give the weights of the foods which will produce the same number of calories as will one quart of milk containing respectively 3 percent, 3½ percent, and 4 percent of fat.

A METHOD FOR COMPARISON

The comparative weights as given in Columns 11, 12, and 13 are useful no matter what the cost of milk or of the food may be. A comparison between the cost of milk and the cost of any of these foods may be made by multiplying the weight of the food corresponding to one quart of milk by the cost per pound of the food, and comparing the value thus obtained with the cost of one quart of milk. For example, .955 of a pound of ribs of beef (Table 3, second item, Column 12) is equivalent in energy value to one quart of milk containing 3½ percent of fat. If such a cut of beef costs 30 cents per pound, then 30 cents × .955, or 28.65 cents, equals the cost of a weight of ribs of beef equivalent in energy value to one quart of 3½-percent milk. Hence if 3½-percent milk costs 12 cents a quart, this cut of beef is more than 2⅓ times as expensive for food as is milk.

Column 14 shows the number of calories which can be obtained for 10 cents when the price of the food is that given in the table. If the price at which any one of the foods may be bought is different from that given in Column 7, then the number of calories which can be bought for 10 cents may be found by dividing the number of calories per pound (given in Column 6) by the local market price per pound, and multiplying this quotient by ten. For example, if ribs of beef (Table 3, second item) cost 30 cents instead of 25 cents a pound, then the number of calories which may be purchased for 10 cents is obtained by the following calculation: $655.4 \div 30 = 21.85$; $21.85 \times 10 = 218.5$, the number of calories that can be purchased for 10 cents.

A direct comparison with milk of any of the foods listed may be made by dividing the number of calories per pound of the food by the price per pound. This quotient multiplied by the cost of a quart of milk will give the number of calories which can be bought at the same cost as a quart of milk. For example, to compare ribs of beef at 30 cents a pound with 4-percent milk at 14 cents a quart, the following computation is necessary: $655.4 \div 30 = 21.85$; $21.85 \times 14 = 305.9$, the number of calories in ribs of beef that can be bought for 14 cents.

A quart of 4-percent milk yields about 660 calories. Then, at the prices taken, more than twice as many units of energy can be obtained from milk as from ribs of beef.

TABLE 2.—DAIRY PRODUCTS: ANALYSES AND ENERGY VALUES
Comparisons are with milk containing 3 percent, 3½ percent, and 4 percent of fat

	Protein	Fat	Carbohydrates	Food substance per pound	Calories per pound	Total calories per pound	Price per pound	Cost of quantity equivalent to one quart of milk containing—			Weight of quantity equivalent to one quart of milk containing—			Calories for $0.10
								3% fat	3½% fat	4% fat	3% fat	3½% fat	4% fat	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	perct.	*perct.*	*perct.*	*grams*	*calories*	*calories*	*$*	*¢*	*¢*	*¢*	*lbs.*	*lbs.*	*lbs.*	*calories*
BUTTER*	1.00			4.54	18.2									
		85.00		385.60	3470.4									
			0.0	0.00	0.0	3488.6	.51	7.99	9.05	9.66	.157	.173	.189	684.0
CHEESE*														
American, full cream	33.58			152.30	609.2									
		33.27		150.90	1358.1									
			0.0	0.00	0.0	1967.3	.35	9.73	11.01	11.75	.278	.315	.336	562.1
Brick	23.80			108.00	432.0									
		28.86		130.90	1178.1									
			0.0	0.00	0.0	1610.1	.40	13.59	15.38	16.41	.340	.384	.410	402.5
Cottage	20.90			94.80	379.2									
		1.00		4.54	40.9									
			4.3	19.50	78.0	498.1	.15	16.41	18.64	19.89	1.098	1.243	1.326	332.1
Neufchatel	18.70			84.82	339.3									
		27.40		124.30	1118.7									
			1.5	6.80	27.2	1485.2	.40	14.73	16.67	17.79	.368	.417	.445	371.3

TABLE 2.—DAIRY PRODUCTS, *Concluded*

	Protein	Fat	Carbohydrates	Food substance per pound	Calories per pound	Total calories per pound	Price per pound	Cost of quantity equivalent to one quart of milk containing—			Weight of quantity equivalent to one quart of milk containing—			Calories for $0.10
								3% fat	3½% fat	4% fat	3% fat	3½% fat	4% fat	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	perct.	*perct.*	*perct.*	*grams*	*calories*	*calories*	*$*	*¢*	*¢*	*¢*	*lbs.*	*lbs.*	*lbs.*	*calories*
CHEESE, *cont'd*														
Swiss	29.07			131.90	527.6									
		29.05		131.80	1286.2									
			0.0	0.00	0.0	1813.8	.42	12.66	14.33	15.30	.302	.341	.364	431.9
CREAM	2.75			12.48	49.9	1338.3	.40							
		30.00		136.10	1224.9	(or	per							
			3.5	15.88	63.5	1390.6	pt.	15.73	17.81	19.00	.393	.445	.475	347.7
						per pt.)								
MILK														
Condensed, sweetened	7.76			35.20	140.8									
		9.70		44.00	396.0									
			57.58	261.20	1044.8	1581.6	.20	6.92	7.83	8.35	.346	.391	.418	790.8
Condensed, unsweetened	6.69			30.35	121.4									
		8.13		36.88	331.9									
			10.31	46.77	187.1	640.4	.15	12.81	14.50	15.47	.854	.967	1.032	426.9
Buttermilk	3.00			13.61	54.4	171.0	.10							
		.50		2.27	20.4	(or	per							
			5.3	24.04	96.2	1470.6	gal.	3.72	4.21	4.49	.372	.421	.449	1470.6
						per gal.)						gals.		
Skim milk	3.40			15.42	61.7	164.6	.15							
		.30		1.36	12.2	(or	per							
			5.10	22.68	90.7	1432.0	gal.	5.73	6.48	6.92	.383	.432	.461	954.7
						per gal.)						gals.		

TABLE 3.—MEAT: ANALYSES AND ENERGY VALUES

Comparisons are with milk containing 3 percent, 3½ percent, and 4 percent fat

	Protein	Fat	Food substance per pound	Calories per pound	Total calories per pound	Price per pound	Cost of quantity equivalent to one quart of milk containing—			Weight of quantity equivalent to one quart of milk containing—			Calories for $0.10
							3% fat	3½% fat	4% fat	3% fat	3½% fat	4% fat	
	1	2	4	5	6	7	8	9	10	11	12	13	14
	perct.	*perct.*	*grams*	*calories*	*calories*	*$*	*¢*	*¢*	*¢*	*lbs.*	*lbs.*	*lbs.*	*calories*
BEEF													
Chuck	15.8	12.5	71.67 56.70	286.68 510.30	797.0	.20	13.72	15.53	16.58	.686	.777	.829	398.5
Ribs, lean	15.2	9.3	68.95 42.18	275.80 379.62	655.4	.25	20.86	23.61	25.20	.834	.955	1.008	262.2
Round, lean	19.5	7.3	88.45 33.11	353.80 297.99	651.8	.28	23.49	26.59	28.38	.839	.950	1.014	232.8
Sirloin steak	16.5	16.1	74.84 73.03	299.36 657.27	956.6	.30	17.15	19.41	20.72	.572	.647	.691	318.9
Tenderloin	16.2	24.4	73.48 110.70	293.92 996.3	1290.2	.30	12.72	14.39	15.36	.424	.480	.512	430.1
Liver[1]	20.2	3.1	91.63 14.07	366.52 126.63	538.5	.18	18.28	20.69	22.08	1.010	1.150	1.227	299.2
LAMB													
Fore quarter	14.9	21.0	67.58 95.25	270.32 857.25	1127.6	.25	12.12	13.73	14.65	.485	.549	.586	451.0
Hind quarter	16.5	16.1	74.84 73.03	299.36 657.27	956.6	.35	20.01	22.65	24.17	.572	.647	.690	273.3
MUTTON													
Fore quarter	12.3	24.5	55.79 111.10	223.16 999.90	1223.1	.20	8.94	10.12	10.80	.447	.506	.540	611.5
Hind quarter	13.8	23.2	62.60 105.10	250.40 945.90	1196.3	.30	13.71	15.53	16.39	.457	.517	.552	398.8

[1]Beef liver contains 2.5 percent carbohydrates, not shown in table, but included in total calorific value.

TABLE 3.—MEAT, *Concluded*

	Protein	Fat	Food substance per pound	Calories per pound	Total calories per pound	Price per pound	Cost of quantity equivalent to one quart of milk containing—			Weight of quantity equivalent to one quart of milk containing—			Calories for $0.10
							3% fat	3½% fat	4% fat	3% fat	3½% fat	4% fat	
	1	2	4	5	6	7	8	9	10	11	12	13	14
	perct.	*perct.*	*grams*	*calories*	*calories*	*$*	*¢*	*¢*	*¢*	*lbs.*	*lbs.*	*lbs.*	*calories*
PORK													
Bacon,* smoked	9 5		43.09	172.36									
		59.4	269.40	2324.60	2497.0	.45	9.86	11.16	11.91	.219	.248	.265	554.9
Chops, medium	13.4		60.78	243.12									
		24.2	109.80	988.20	1231.3	.30	13.32	15.08	16.10	.444	.503	.537	410.4
Fat, salt	1.9		8.62	34.48									
		86.2	391.00	3519.00	3553.5	.40	6.16	6.97	7.44	.154	.174	.186	888.4
Ham, fresh, medium	13.5		61.23	244.92									
		25.9	117.50	1057.50	1302.4	.30	12.58	14.24	15.20	.419	.475	.507	434.1
Ham, smoked,* lean	17.5		79.38	317.52									
		18.5	83.91	755.19	1072.7	.34	17.33	19.62	20.94	.510	.577	.616	315.5
Sausage[1]	13.0		58.97	235.88									
		44.2	199.56	1796.04	2051.9	.25	6.66	7.54	8.05	.267	.302	.322	820.8
Shoulder	12.0		54.43	217.72									
		29.8	135.20	1216.80	1434.5	.30	11.44	12.95	13.82	.381	.432	.461	478.2
VEAL													
Cutlet	20.1		91.17	364.68									
		7.5	34.02	306.18	670.9	.30	24.45	27.68	29.54	.815	.923	.985	223.6
Fore quarter	15.1		68.49	273.96									
		6.0	27.22	244.98	518.9	.20	21.08	23.86	25.46	1.054	1.193	1.273	259.5
Hind quarter	16.2		73.48	293.92									
		6.6	29.94	269.46	563.4	.30	29.13	32.97	35.80	.971	1.099	1.173	187.8

[1]Sausage contains 1.1 percent carbohydrates, not shown in table, but included in total calorific value.

TABLE 4.—POULTRY AND EGGS: ANALYSES AND ENERGY VALUES
Comparisons are with milk containing 3 percent, 3½ percent, and 4 percent fat

	Protein	Fat	Food substance per pound	Calories per pound	Total calories per pound	Price per pound	Cost of quantity equivalent to one quart of milk containing—			Weight of quantity equivalent to one quart of milk containing—			Calories for $0.10
							3% fat	3½% fat	4% fat	3% fat	3½% fat	4% fat	
	1	2	4	5	6	7	8	9	10	11	12	13	14
	percent.	*percent.*	*grams*	*calories*	*calories*	*$*	*¢*	*¢*	*¢*	*lbs.*	*lbs.*	*lbs.*	*calories*
CHICKEN													
Broilers	12.8		58.06	232.24									
		1.4	6.35	57.15	289.4	.30	56.69	64.17	68.48	1.890	2.139	2.282	96.5
Fowls*	13.7		62.14	248.56									
		12.3	55.79	502.11	750.7	.27	19.67	22.27	23.76	.728	.825	.880	278.0
GOOSE	13.4		60.78	243.12									
		29.8	135.2	1216.8	1459.9	.30	11.24	12.72	13.58	.375	.424	.453	486.6
TURKEY*	16.1		73.03	292.12									
		18.4	83.46	751.14	1043.3	.32	16.77	18.99	20.24	.524	.593	.633	326.0
EGGS*	11.9		53.98	215.92									
		9.3	42.18	379.62	595.5	.37	33.98	38.46	41.05	.918	1.039	1.109	160.9

TABLE 5.—FISH: ANALYSES AND ENERGY VALUES

Comparisons are with milk containing 3 percent, 3½ percent, and 4 percent fat

	Protein	Fat	Food substance per pound	Calories per pound	Total calories per pound	Price per pound	Cost of quantity equivalent to one quart of milk containing—			Weight of quantity equivalent to one quart of milk containing—			Calories for $0.10
							3% fat	3½% fat	4% fat	3% fat	3½% fat	4% fat	
	1	2	4	5	6	7	8	9	10	11	12	13	14
	perct.	*perct.*	*grams*	*calories*	*calories*	*$*	*¢*	*¢*	*¢*	*lbs.*	*lbs.*	*lbs.*	*calories*
Halibut steak	15.3		69.40	277.60									
		4.4	19.96	179.64	457.2	.28	33.49	37.91	40.46	1.196	1.354	1.445	163.3
Mackerel, salt	16.3		73.94	295.76									
		17.4	78.93	710.37	1006.1	.20	10.87	12.31	13.13	.544	.615	.657	503.1
Salmon, dressed	13.8		62.60	250.40									
		8.1	36.74	330.66	581.1	.30	28.23	31.96	34.11	.941	1.065	1.137	193.7
Whitefish	10.6		48.08	192.32									
		3.0	13.61	122.49	314.8	.20	34.74	39.33	41.97	1.737	1.968	2.099	157.4

TABLE 6.—VEGETABLE FOODS: ANALYSES AND ENERGY VALUES

Comparisons are with milk containing 3 percent, 3½ percent, and 4 percent fat

	Protein	Fat	Carbohydrates	Food substance per pound	Calories per pound	Total calories per pound	Price per pound	Cost of quantity equivalent to one quart of milk containing—			Weight of quantity equivalent to one quart of milk containing—			Calories for $0.10
								3% fat	3½% fat	4% fat	3% fat	3½% fat	4% fat	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	perct.	*perct.*	*perct.*	*grams*	*calories*	*calories*	*$*	*¢*	*¢*	*¢*	*lbs.*	*lbs.*	*lbs.*	*calories*
BREAD														
Graham	8.9	1.8	52.1	40.37 8.16 236.30	161.5 73.4 945.2	1180.1	.10	4.63	5.25	5.60	.463	.525	.560	1180.1
White	9.1	1.6	53.3	41.28 7.26 241.80	165.1 65.3 967.2	1197.6	.10	4.57	5.17	5.52	.457	.517	.552	1197.6
Whole wheat	9.7	.9	49.7	44.00 4.08 225.40	176.0 36.7 901.6	1114.3	.10	4.91	5.56	5.93	.491	.556	.593	1114.3
Average	9.2	1.3	53.1	41.73 5.90 240.90	166.9 53.1 963.6	1183.6	.10	4.62	5.23	5.58	.462	.523	.558	1183.6
Crackers, soda	9.8	9.1	73.1	44.45 41.28 331.60	177.8 371.5 1226.4	1875.7	.20	5.83	6.60	7.04	.292	.330	.352	937.9
FLOURS, MEALS, ETC.														
Barley, pearled	8.5	1.1	77.8	38.56 4.99 352.90	154.2 44.9 1411.6	1610.7	.20	6.79	7.69	8.20	.340	.384	.410	805.4
Buckwheat flour	6.4	1.2	77.9	29.03 5.44 353.30	116.1 49.0 1413.2	1578.3	.11	3.81	4.32	4.60	.346	.392	.419	1434.8

TABLE 6.—VEGETABLE FOODS, *Concluded*

	Protein	Fat	Carbohydrates	Food substance per pound	Calories per pound	Total calories per pound	Price per pound	Cost of quantity equivalent to one quart of milk containing—			Weight of quantity equivalent to one quart of milk containing—			Calories for $0.10
								3% fat	3½% fat	4% fat	3% fat	3½% fat	4% fat	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	perct.	*perct.*	*perct.*	*grams*	*calories*	*calories*	*$*	*¢*	*¢*	*¢*	*lbs.*	*lbs.*	*lbs.*	*calories*
Corn meal.....	9.2	1.9	75.4	41.23 8.62 342.00	164.9 77.6 1368.0	1610.5	.06½	2.21	2.50	2.67	.340	.384	.410	2477.7
Hominy*	8.3	.6	79.0	37.65 2.72 358.30	150.6 24.5 1433.2	1608.3	.06½	2.21	2.50	2.67	.340	.385	.411	2474.3
Macaroni.....	13.4	.9	74.1	60.78 4.08 336.10	243.1 36.7 1344.4	1624.2	.16	5.39	6.10	6.50	.337	.381	.407	1015.1
Oats, rolled.....	16.7	7.3	66.2	75.75 33.11 300.28	303.0 298.0 1201.1	1802.1	.08¾	2.66	3.01	3.21	.303	.344	.367	2059.5
Rice*.....	8.0	.3	79.0	36.29 1.36 358.30	145.2 12.2 1433.2	1590.6	.12	4.13	4.67	4.98	.344	.389	.415	1325.5
Rye flour.....	6.8	.9	78.7	30.84 4.08 357.00	123.4 36.7 1428.0	1588.1	.06	2.07	2.34	2.50	.344	.390	.416	2646.8
Wheat flour,* graham.....	13.3	2.2	71.4	60.33 9.98 323.90	241.3 89.8 1295.6	1626.7	.06½	2.19	2.47	2.64	.336	.381	.406	2502.6
Patent*.....	13.3	1.5	72.7	60.33 6.80 329.80	241.3 61.2 1319.2	1611.7	.06	2.04	2.30	2.46	.339	.384	.410	2686.2
Wheat, shredded.	10.5	1.4	77.9	47.63 6.35 353.30	190.5 57.2 1413.2	1660.9	.20	6.59	7.45	7.96	.329	.373	.398	830.5

TABLE 7.—FRUITS: ANALYSES AND ENERGY VALUES
Comparisons are with milk containing 3 percent, 3½ percent, and 4 percent fat

	Protein	Fat	Carbohydrates	Food substance per pound	Calories per pound	Total calories per pound	Price per pound	Cost of quantity equivalent to one quart of milk containing—			Weight of quantity equivalent to one quart of milk containing—			Calories for $0.10
								3% fat	3½% fat	4% fat	3% fat	3½% fat	4% fat	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	perct.	*perct.*	*perct.*	*grams*	*calories*	*calories*	*$*	*¢*	*¢*	*¢*	*lbs.*	*lbs.*	*lbs.*	*calories*
Bananas.....	.8			3.63	14.5									
		.4		1.81	16.3									
			14.3	64.57	258.3	289.1	.08	14.13	17.13	18.28	1.892	2.141	2.285	361.4
Dates, dried.....	1.9			8.62	34.5									
		2.5		11.34	102.1									
			70.6	320.20	1280.8	1417.4	.29	11.19	12.67	13.52	.386	.437	.466	488.8
Figs, dried.....	4.3			19.50	78.0									
		.3		1.36	12.2									
			74.2	336.60	1346.4	1436.6	.30	11.42	12.93	13.80	.381	.431	.460	478.9
Prunes,* dried...	1.8			8.16	32.6									
		0.0		0.00	00.0									
			62.2	282.10	1128.4	1161.0	.14	6.59	7.47	7.97	.471	.533	.569	829.3
Raisins.....	2.3			10.43	41.7									
		3.0		13.61	122.5									
			68.5	310.70	1242.8	1407.0	.20	7.77	8.80	9.39	.389	.440	.470	703.5

TABLE 8.—VEGETABLES: ANALYSES AND ENERGY VALUES
Comparisons are with milk containing 3 percent, 3½ percent, and 4 percent fat

	Protein	Fat	Carbohydrates	Food substance per pound	Calories per pound	Total calories per pound	Price per pound	Cost of quantity equivalent to one quart of milk containing—			Weight of quantity equivalent to one quart of milk containing—			Calories for $0.10
								3% fat	3½% fat	4% fat	3% fat	3½% fat	4% fat	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	perct.	*perct.*	*perct.*	*grams*	*calories*	*calories*	*$*	*¢*	*¢*	*¢*	*lbs.*	*lbs.*	*lbs.*	*calories*
Beans,* dried....	22.5			102.00	408.4									
		1.8		8.16	73.4									
			59.6	270.30	1081.2	1563.0	.19	6.65	7.53	8.03	.350	.396	.423	822.6
Lima beans,* dried.....	18.1			82.10	328.4									
		1.5		6.80	61.2									
			65.9	298.90	1195.6	1585.2	.18	6.21	7.03	7.50	.345	.391	.417	880.7
Beans, baked, canned.....	6.9			31.30	125.2									
		2.5		11.34	102.1									
			19.6	88.90	355.6	582.9	.20	18.77	21.24	22.67	.938	1.062	1.133	291.5
Beets.....	1.3			5.90	23.6									
		.1		.45	4.1									
			7.7	34.93	139.7	167.4	.05	16.33	18.49	19.73	3.267	3.698	3.946	334.8
Carrots.....	.9			4.08	16.3									
		.2		.91	8.2									
			7.4	33.57	134.3	158.8	.05	17.22	19.49	20.80	3.444	3.898	4.160	317.6
Lentils.....	25.7			116.57	466.3									
		1.0		4.54	40.9									
			59.2	268.53	1074.1	1581.3	.25	8.64	9.79	10.44	.346	.391	.418	632.5

TABLE 8.—VEGETABLES, *Concluded*

	Protein	Fat	Carbohydrates	Food substance per pound	Calories per pound	Total calories per pound	Price per pound	Cost of quantity equivalent to one quart of milk containing—			Weight of quantity equivalent to one quart of milk containing—			Calories for $0.10
								3% fat	3½% fat	4% fat	3% fat	3½% fat	4% fat	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	perct.	*perct.*	*perct.*	*grams*	*calories*	*calories*	*$*	*¢*	*¢*	*¢*	*lbs.*	*lbs.*	*lbs.*	*calories*
Onions.....	1.4			6.35	25.4									
		.3		1.36	12.2									
			8.9	40.37	161.5	199.1	.05	13.73	15.55	16.59	2.746	3.109	3.318	398.2
Parsnips.....	1.3			5.90	23.6									
		.4		1.81	16.3									
			10.8	48.99	195.0	234.9	.05	11.04	13.18	14.06	2.328	2.635	2.812	469.8
Peas, canned....	3.6			16.33	65.3									
		.2		.91	8.2									
			9.8	44.45	177.8	251.3	.20	43.52	49.27	52.58	2.176	2.463	2.629	125.7
Peas, dried.....	24.6			111.60	446.4									
		1.0		4.54	40.9									
			62.0	281.20	1124.8	1612.1	.15	5.09	5.76	6.15	.339	.384	.410	1074.7
Potatoes,* white, raw.....	1.8			8.16	32.6									
		.1		.45	4.1									
			14.7	66.68	266.7	303.4	.02½	4.51	5.10	5.44	1.802	2.040	2.177	1213.6
Potatoes, sweet, raw.....	1.4			6.35	25.4									
		.6		2.72	24.5									
			21.9	99.34	397.4	447.3	.06	7.34	8.30	8.86	1.223	1.384	1.477	745.5
Rutabagas.....	.9			4.08	16.3									
		.1		.45	4.1									
			6.0	27.22	108.9	129.3	.04	16.92	19.15	20.44	4.229	4.788	5.109	323.3
Turnips.....	.9			4.08	16.3									
		.1		.45	4.1									
			5.7	25.85	103.4	123.7	.04	17.68	20.02	21.36	4.421	5.005	5.341	309.3

TABLE 9.—MISCELLANEOUS: ANALYSES AND ENERGY VALUES
Comparisons are with milk containing 3 percent, 3½ percent, and 4 percent fat

	Protein	Fat	Carbohydrates	Food substance per pound	Calories per pound	Total calories per pound	Price per pound	Cost of quantity equivalent to one quart of milk containing—			Weight of quantity equivalent to one quart of milk containing—			Calories for $0.10
								3% fat	3½% fat	4% fat	3% fat	3½% fat	4% fat	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	perct.	*perct.*	*perct.*	*grams*	*calories*	*calories*	*$*	*¢*	*¢*	*¢*	*lbs.*	*lbs.*	*lbs.*	*calories*
CHOCOLATE.....	12.9			58.51	234.0									
		48.7		220.90	1988.1									
			30.3	137.40	549.6	2771.7	.40	7.89	8.93	9.53	.197	.223	.238	692.9
COCOA.....	21.6			97.98	391.9									
		28.9		131.10	1179.9									
			37.7	171.00	684.0	2254.8	.25	6.06	6.86	7.32	.243	.275	.293	901.9
NUTS														
Almonds.....	11.5			52.16	208.6									
		30.2		136.98	1232.8									
			9.5	43.09	172.4	1613.8	.30	10.16	11.51	12.28	.339	.384	.409	537.9
Brazil nuts.....	8.6			39.01	156.0									
		33.7		152.86	1375.7									
			3.5	16.11	64.4	1486.1	.30	10.97	12.41	13.25	.366	.414	.442	495.4
Chestnuts, fresh.	5.2			23.59	94.4									
		4.5		20.41	183.7									
			35.4	160.57	642.3	920.4	.30	17.82	20.18	21.53	.594	.673	.718	306.8

TABLE 9.—MISCELLANEOUS, *Concluded*

	Protein	Fat	Carbohydrates	Food substance per pound	Calories per pound	Total calories per pound	Price per pound	Cost of quantity equivalent to one quart of milk containing—			Weight of quantity equivalent to one quart of milk containing—			Calories for $0.10
								3% fat	3½% fat	4% fat	3% fat	3½% fat	4% fat	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	perct.	*perct.*	*perct.*	*grams*	*calories*	*calories*	*$*	*¢*	*¢*	*¢*	*lbs.*	*lbs.*	*lbs.*	*calories*
NUTS, *cont'd*														
Cocoanut, prepared	6.3			28.58	114.3									
		57.4		260.30	2342.7									
			31.5	142.90	571.6	3028.6	.40	7.22	8.18	8.72	.181	.204	.218	757.2
Hickory nuts	5.8			26.31	105.2									
		25.5		115.70	1031.3									
			4.3	19.50	78.0	1114.5	.08⅓	4.09	4.63	4.94	.491	.555	.593	1337.4
Peanuts	19.5			88.45	353.8									
		29.1		131.99	1187.9									
			18.5	83.91	335.6	1877.3	.15	4.37	4.95	5.28	.291	.330	.352	1251.5
Peanut butter	29.3			132.90	531.6									
		46.5		215.80	1942.2									
			17.1	77.56	310.2	2504.0	.35	7.64	8.65	9.23	.218	.247	.264	715.4
Pecans, polished	5.2			23.59	94.4									
		33.3		151.04	1359.4									
			6.2	28.12	112.5	1566.3	.30	10.47	11.86	12.65	.349	.395	.422	522.1
Walnuts, California soft-shell	6.9			31.30	125.2									
		26.6		120.66	1085.9									
			6.8	30.84	123.4	1334.5	.30	12.29	13.92	14.85	.410	.464	.495	444.8

MILK IS A COMPARATIVELY CHEAP FOOD

Attention is here called to some of the striking comparisons brought out in the foregoing tables.

It will be noted that with round steak at 28 cents a pound, the housewife would have to invest 28.38 cents in order to buy a quantity equaling in food value one quart of 4-percent milk (Table 3). Lamb and mutton are not so expensive in proportion to milk as are most cuts of beef, but it will be seen from Table 3 that with the exception of the fore quarter of mutton, this sort of meat is more expensive than 4-percent milk.

Pork chops, ham, and shoulder are more expensive than 4-percent milk. Bacon and fat salt pork are cheaper than milk as a source of energy alone; however, it must be remembered that these two are poor in protein and so cannot take the place of milk in the diet.

Veal costs about twice as much as 4-percent milk for the same food value.

Chicken (Table 4) at 27 cents a pound is more than one-half again as expensive as 4-percent milk, while broilers at 30 cents are almost five times as expensive. Even eggs at 37 cents a pound, which is about 48 cents a dozen, are about two and one-half times as costly as 4-percent milk.

Among the fishes (Table 5) salt mackerel costs nearly the same as 4-percent milk, while the fresh fishes, such as salmon, halibut, and whitefish cost about two and one-half times as much.

The cereal foods (Table 6), such as bread, corn meal, etc., are in general much cheaper than milk as a source of energy, but as they contain relatively very much carbohydrate, they should not be used to wholly replace foods which contain more protein.

Of the fruits (Table 7), only those that are dried are as cheap as milk. The same is generally true of the vegetables (Table 8) except with regard to potatoes. For instance, canned peas, one of the very common articles of diet appearing on our tables, at 20 cents a pound require an investment of 52.58 cents if one is to purchase the same food value as is contained in one quart of 4-percent milk.

These statements are not to be construed as an argument for substituting milk for all the above mentioned foods, nor even entirely for any one of them, especially the vegetables and fruits, which serve their own important purpose in the diet, but rather to demonstrate to the reader that in cutting down or discontinuing the use of milk, one is really dispensing with an article of food which is comparatively cheap even at present prices.

Perhaps one of the large reasons why milk has been considered an expensive article in the diet is that, being a liquid, the public has

not considered its food value. Milk contains about 87 percent of water, the remaining 13 percent being made up of food materials. Some other common foods contain water approximately as shown below:

Food	Percent water	Food	Percent water
Ribs of beef	55	Eggs	65
Round steak	65	Bread	35 to 50
Veal	55	Potatoes	78
Mutton	45	Turnips	89 to 90
Salmon (dressed)	60	Canned peas	85
Whitefish	32.5	Bananas	75
Salt mackerel	35		

Turnips are commonly thought of as a very cheap article of food. Yet they contain 89 to 90 percent of water; and at 4 cents a pound one would have to spend 21.36 cents in order to buy food value equal to that in one quart of 4-percent milk.

For a list of foods with which milk and other dairy products are most logically compared, see Tables 10, 11, 12, and 13.

ARE COMPARISONS ON THE BASIS OF ENERGY VALUE FAIR?

Comparisons on the basis of energy value alone are in many cases unfair to one or the other of the foods compared. Milk containing 4 percent of fat yields about 660 calories per quart. Pure lard yields 4,082 calories per pound. In energy value a pound of lard is equivalent to almost 6 1/5 quarts of 4-percent milk. While this quantity of 4-percent milk yields energy equivalent to that yielded by a pound of lard, it must be remembered that the milk contains protein and sugar in addition to fat. It is a well-balanced food and in this respect 6 1/5 quarts of milk are of far greater value in the diet than is a pound of lard. In like manner milk should not be compared with a pure carbohydrate like granulated sugar, which gives 1,814 calories per pound, an amount of energy equivalent to that afforded by 2 3/4 quarts of 4-percent milk. Also, milk should not be compared on the basis of energy value alone with the cereal products, bread, corn meal, oats, rice, etc., which consist largely of carbohydrates.

PROTEIN THE MOST EXPENSIVE

Of the three classes of food substances it should be noticed that protein is in general more expensive than either fat or carbohydrate. The chief source of protein in the usual diet is the animal-food products, while practically all the carbohydrates except the sugar in milk

are obtained from vegetable foods and fat[1] may be obtained from vegetable sources also. It is reasonable that foods of animal origin should be more costly than those of vegetable origin because the production of the former involves the use of the latter in the life processes of the animal.

FOODS WHICH MAY BE COMPARED

As the human body requires for its sustenance all three of these classes of food substances, we may compare, with a considerable degree of fairness, those foods which contain protein and one or both of the other two classes. Such foods as beef, lamb, mutton, eggs, moderately lean pork, poultry, fish, and cheese are rather closely comparable with milk and with each other. None of the common vegetable foods, with the possible exception of the legumes, beans, peas, etc., which contain larger amounts of protein than do most of the other vegetables, can be very closely compared with milk.

FOODS COMPARABLE WITH MILK

From the list of foods included in Tables 2 to 9, some foods which are most logically comparable with milk have been selected. Comparisons of these foods on the bases of protein and of total energy are given in Table 10. The first column of figures gives the weight of

TABLE 10.—WEIGHTS OF FOODS CONTAINING AN AMOUNT OF PROTEIN AND PRODUCING ENERGY EQUIVALENT TO ONE QUART OF FOUR-PERCENT MILK

	Protein	Total energy
Sirloin steak	6⅓ oz.	11 oz.
Round steak	5⅞ oz.	16⅛ oz.
Pork chops	7⅛ oz.	8¾ oz.
Ham, lean smoked	6 oz.	9⅛ oz.
Fowl	7⅜ oz.	14 oz.
Eggs	4⅖	8⅘
Halibut steak	6⅛ oz.	23 oz.
Mackerel, salt	6⅖ oz.	10½ oz.
Salmon, dressed	7⅜ oz.	18⅛ oz.
Whitefish	9⅘ oz.	33⅜ oz.
Full cream cheese	3⅓ oz.	5⅜ oz.
Cottage cheese	5 oz.	21½ oz.
Dry beans	4⅗ oz.	6¾ oz.
Baked beans, canned	15⅛ oz.	18 oz.
Dry peas	4¼ oz.	6½ oz.
Canned peas	29 oz.	42 oz.
Rolled oats	6⅗ oz.	5½ oz.
Peanut butter	3⅜ oz.	4⅛ oz.

[1]As this circular deals only with those constituents of foods the energy value of which can be stated in a quantitative manner, no mention is made of the indispensable dietary constituents fat-soluble A and water-soluble B, sometimes called "vitamines." Both are present in whole milk in large amounts. Fat-soluble A is abundant in butter fat. The vegetable oils do not furnish fat-soluble A, nor are the body fats of animals, such as lard, beef-fat, etc., important sources of it. See McCollum, E. V., The Newer Knowledge of Nutrition, Macmillan, 1918.

the food which contains an amount of protein equivalent to that in one quart of 4-percent milk; the second column gives the weight of the food which is equivalent in total energy to one quart of 4-percent milk.

As can be seen from Table 10, the weight of any food containing an amount of protein equivalent to that in one quart of 4-percent milk and the weight of the same food containing the amount of energy found in the same amount of milk, may be nearly the same or may be widely different. These variations depend upon the relative amounts of protein, fat, and carbohydrate in the food as compared with the amounts of those same constituents in milk. For example, in the case of pork chops, which contain protein and a large amount of fat, the weights (7 4/5 ounces and 8 3/5 ounces) are nearly the same. In the case of cottage cheese, which contains protein and only very small amounts of fat and carbohydrate, the weights (5 ounces and 21 1/5 ounces) are widely different.

VALUE OF MILK AS A FOOD

The value of milk as a food is not recognized as it deserves to be. In this connection, the United States Department of Agriculture says: "Milk is a food that not only contains all the elements necessary for the growth and maintenance of the body but also combines them in the proper proportions and is economically produced. ..... It is the food prepared by nature especially for the growth and development of the young and contains an abundance of the minerals so much needed. A quart of milk a day is a good allowance for a young growing child. In addition to being an economical food, milk is usually well digested and requires no cooking or other preparation for the table. .....

"Babies who can no longer be nursed by their mothers are forced to depend upon cows' milk as a substitute. Children, invalids and the wounded also depend to a great extent upon milk for nourishment. Being a liquid, it is easily taken by both the very young and the sick, when often solid foods cannot be used. In milk are found certain substances sometimes called vitamines, necessary for growth, which make milk vitally important for children, invalids and wounded. For that reason children who require growth-producing foods, and invalids whose bodies have to combat disease and repair wastes, require milk.

"It has been found that such animal food as milk, eggs and meat contain these growth-producing substances in quantities sufficient for the rapid growth and development of the body. While these substances are found in certain vegetables and grains they are in quantities so small that often in the ordinary diet sufficient quantities are not consumed to meet the needs of the growing body.

"Two facts stand out prominently as reasons for the increased production and use of milk. The first is that milk as purchased on the market usually supplies food material together with the growth-producing elements more economically than either meat or eggs. The second reason is that the dairy cow is the most economical producer of animal food. One great law of food conservation is to turn inedible feeds into edible foods in the cheapest possible manner. The dairy cow will utilize coarse materials, inedible by humans, such as grass, corn stalks, hay, etc., and will turn them into milk which is suitable for human food. Other farm animals also are converters of coarse roughage into edible foods, but none are so efficient as the dairy cow."[1]

SKIM MILK AND OTHER FOODS COMPARED

In Table 11 comparisons are made of the foods listed in Table 10 with skim milk containing 0.3 percent of fat. The comparisons are made using one gallon of skim milk as a basis.

VALUE OF SKIM MILK AS FOOD

Concerning skim milk, the United States Department of Agriculture states that, as a by-product of buttermaking alone there were, in 1917, "29,117,634,000 pounds of skim milk, which contain more protein than all the beef consumed in this country in one year..... The possibilities of increasing the supply of human food by the fuller

TABLE 11.—WEIGHTS OF FOODS CONTAINING AN AMOUNT OF PROTEIN AND PRODUCING ENERGY EQUIVALENT TO ONE GALLON OF SKIM MILK CONTAINING 0.3 PERCENT OF FAT

	Protein	Total energy
Sirloin steak	1 lb. 12⅗ oz.	1 lb. 7⅒ oz.
Round steak	1 lb. 8⅗ oz.	2 lbs. 3⅒ oz.
Pork chops	2 lbs. 3⅒ oz.	1 lb. 2⅗ oz.
Ham, lean smoked	1 lb. 11 oz..	1 lb. 5⅗ oz.
Fowl	2 lbs. 2½ oz.	1 lb. 14½ oz.
Eggs	19⅕	19⅕
Halibut, steak	1 lb. 14⅗ oz.	3 lbs. 2⅒ oz.
Mackerel, salt	1 lb. 12⅗ oz.	1 lb. 6⅘ oz.
Salmon, dressed	2 lbs. 2⅗ oz.	2 lbs. 7⅖ oz.
Whitefish	2 lbs. 12⅒ oz.	4 lbs. 8⅘ oz.
Full cream cheese	14⅕ oz.	11⅗ oz.
Cottage cheese	1 lb. 6⅗ oz.	2 lbs. 14 oz.
Dry beans	1 lb. 5 oz.	14⅗ oz.
Baked beans, canned	4 lbs. 4⅗ oz.	2 lbs. 7⅒ oz.
Canned peas	8 lbs. 3⅗ oz.	5 lbs. 11⅕ oz.
Dry peas	1 lb. 3⅕ oz.	14⅕ oz.
Rolled oats	1 lb. 12⅗ oz.	12⅒ oz.
Peanut butter	1 lb. ⅒ oz.	9⅕ oz.

[1]This quotation and those made on the following pages regarding the value of skim milk, cottage cheese, and cheddar cheese, are taken from Circ. 85, Office of the Secretary, U. S. Department of Agriculture, January, 1918.

utilization of this by-product are enormous..... Skim milk may be used to advantage in several ways in the human diet: (1) In its natural state; (2) in the form of condensed skim milk, skim-milk powder and (3) as skim-milk cheese, either hard or soft."

COTTAGE CHEESE AND OTHER FOODS COMPARED

In Table 12 the foods listed in Table 10 are compared with cottage cheese. The values given are the weights equivalent to one pound of cottage cheese.

TABLE 12.—WEIGHTS OF FOODS CONTAINING AN AMOUNT OF PROTEIN AND PRODUCING ENERGY EQUIVALENT TO ONE POUND OF COTTAGE CHEESE

	Protein	Total energy
Sirloin steak	1 lb. 4⁹⁄₁₀ oz.	8⅛ oz.
Round steak	1 lb. 1⅑₀ oz.	12⅛ oz.
Pork chops	1 lb. 9 oz.	6½ oz.
Ham, lean smoked	1 lb. 3⅑₀ oz.	7⅜ oz.
Fowl	1 lb. 8⅜ oz.	10⅜ oz.
Eggs	14	6⁷⁄₁₀
Halibut, steak	1 lb. 5⅛ oz.	1 lb. 1⅜ oz.
Mackerel, salt	1 lb. 4½ oz.	7⁹⁄₁₀ oz.
Salmon, dressed	1 lb. 8⅛ oz.	13⁷⁄₁₀ oz.
Whitefish	1 lb. 15½ oz.	1 lb. 9⁹⁄₁₀ oz.
Full cream cheese	10 oz.	4 oz.
Dry beans	14⁹⁄₁₀ oz.	5⅑₀ oz.
Baked beans, canned	3 lbs. ½ oz.	13⁷⁄₁₀ oz.
Canned peas	5 lbs. 12⁹⁄₁₀ oz.	1 lb. 15⁷⁄₁₀ oz.
Dry peas	13⅜ oz.	5 oz.
Rolled oats	1 lb. 4 oz.	4⅜ oz.
Peanut butter	11⅜ oz.	3⅛ oz.

VALUE OF COTTAGE CHEESE AS FOOD[1]

With regard to the value of cottage cheese as a food, the following statements are made by the U. S. Department of Agriculture:

"Cottage cheese is one of the important meat substitutes. It contains a larger percentage of protein ..... than most meats and furnishes this material at a lower cost. In every pound of cottage cheese there is about one-fifth of a pound of protein, nearly all of which is digestible. Meats, on the other hand, usually contain less protein and besides have a certain waste, such as bone and other inedible material. A pound of cottage cheese daily would supply all the protein required by the ordinary adult engaged in a sedentary occupation. ..... If one-half a pound a week were consumed by each person on farms where cows are kept it could replace considerably more than half a billion pounds of meat in a year. This is more than all the beef that was exported to our Allies last year."

[1]*For information concerning many of the uses of cottage cheese in the diet, see Circ. 109, Office of the Secretary, U. S. Department of Agriculture.*

CHEDDAR OR "STORE" CHEESE AND OTHER FOODS COMPARED

Table 13 shows comparisons of the same foods as those listed in Tables 10, 11, and 12, with American cheddar or "store" cheese. The values given are the weights equivalent to one pound of cheese.

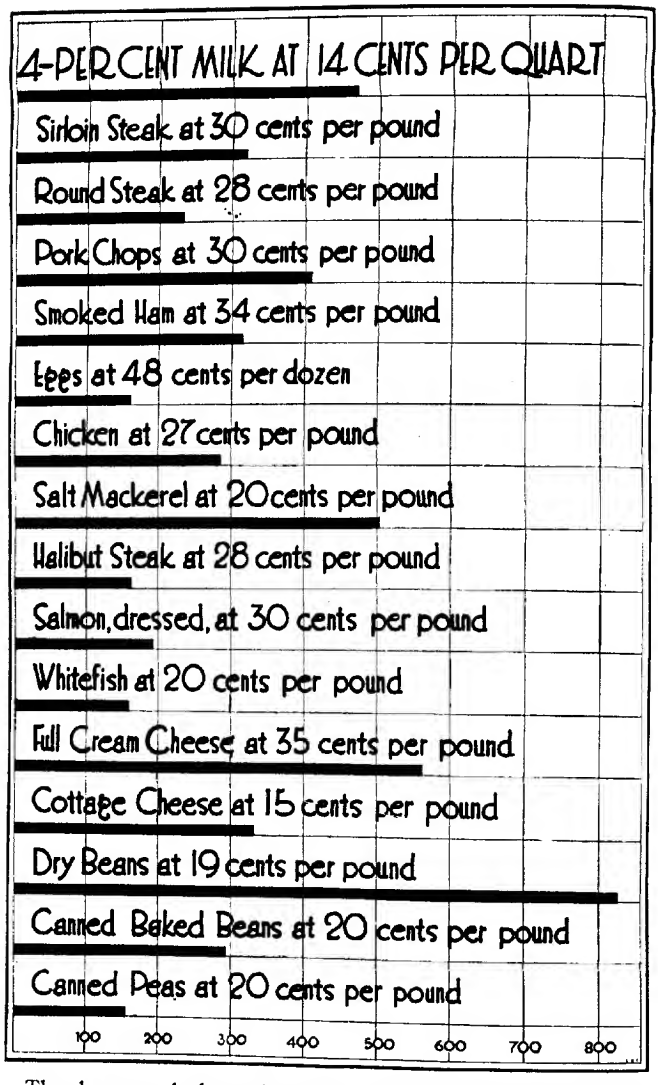
The extremely high food value of American cheddar or "store" cheese, both as regards protein and total energy, entitles it to a much more important place in the diet than it has commonly been given in this country. Travelers going into places where the food supply is uncertain and desiring to carry food providing a large amount of energy with as little bulk as possible have long recognized its value. Experiments by the United States Department of Agriculture have demonstrated that contrary to the general impression, cheddar cheese is not indigestible or constipating; indeed, 95 percent of it is digestible and 90 percent of its energy is available.

TABLE 13.—WEIGHTS OF FOODS CONTAINING AN AMOUNT OF PROTEIN AND PRODUCING ENERGY EQUIVALENT TO ONE POUND OF CHEDDAR OR "STORE" CHEESE

	Protein	Total energy
Sirloin steak	2 lbs. ½ oz.	2 lbs. 9/10 oz.
Round steak	1 lb. 11½ oz.	3 lbs. 3/10 oz.
Pork chops	2 lbs. 8/10 oz.	1 lb. 9⅗ oz.
Ham, lean smoked	1 lb. 14 7/10 oz.	1 lb. 13⅗ oz.
Fowl	2 lbs. 7⅕ oz.	2 lbs. 9/10 oz.
Eggs	22½	26½
Halibut, steak	2 lbs. 3/10 oz.	4 lbs. 4⅘ oz.
Mackerel, salt	2 lbs. 1 oz.	1 lb. 15⅗ oz.
Salmon, dressed	2 lbs. 6⅗ oz.	3 lbs. 6⅕ oz.
Whitefish	3 lbs. 2⅗ oz.	6 lbs. 4 oz.
Cottage cheese	1 lb. 9⅗ oz.	3 lbs. 15⅕ oz.
Dry beans	1 lb. 7⅗ oz.	1 lb. 4⅕ oz.
Baked beans, canned	4 lbs. 13⅗ oz.	3 lbs. 6 oz.
Canned peas	9 lbs. 5¼ oz.	7 lbs. 13¼ oz.
Dry peas	1 lb. 5⅘ oz.	1 lb. 3½ oz.
Rolled oats	2 lbs. ⅕ oz.	1 lb. 1½ oz.
Peanut butter	1 lb. 2⅕ oz.	12⅗ oz.

It will be noted from Table 13 that it takes 2 pounds of sirloin steak, 22 eggs, 3 pounds of whitefish, nearly 5 pounds of canned baked beans, or more than 9 pounds of canned peas to equal in protein value one pound of cheddar cheese. To equal the energy value of one pound of cheddar cheese, 2 pounds of sirloin steak, 26 eggs, over 6 pounds of whitefish, more than 3 pounds of canned baked beans, and almost 8 pounds of canned peas are necessary.

As a substitute for meat, cheddar cheese holds first rank both in regard to food value and to relative cost. Instead of being used solely as an appetizer or condiment, it is worthy of and should be given a substantial place in the American diet.



The above graph shows the Number of Calories that can be bought for Ten Cents when the foods are selling at the prices given. Note the relative inexpensiveness of Milk.

For further interesting comparisons, see Tables 2 to 9.